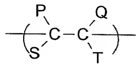
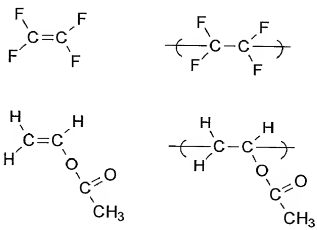
that undergoes free radical polymerization will afford a polymer having a repeat unit:

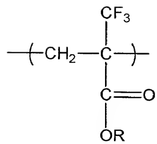


where P, Q, S, and T independently can be the same or different and illustratively could be fluorine, hydrogen, chlorine, and trifluoromethyl.

If only one ethylenically unsaturated compound undergoes polymerization, the resulting polymer is a homopolymer. If two or more distinct ethylenically unsaturated compounds undergo polymerization, the resulting polymer is a copolymer.

Some representative examples of ethylenically unsaturated compounds and their corresponding repeat units are given below:





wherein R is a hydrocarbon-containing group, preferably C_1 to C_8 alkyl.

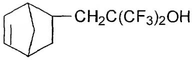
Each fluorine-containing copolymer according to this invention has an absorption coefficient of less than 4.0 absorption units per micron at a wavelength of 157 nm, preferably of less than 3.5 absorption units per micron at this wavelength, more preferably, of less than 3.0 absorption units per micron at this wavelength, and, still more preferably, of less than 2.5 absorption units per micron at this wavelength.

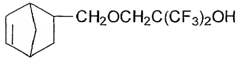
The fluorinated polymers, photoresists, and processes that involve a fluoroalcohol functional group may have the structure:

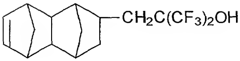
$-XCH_2C(R_f)(R_f') OH$

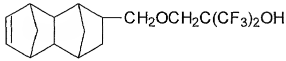
wherein R_f and R_f' are the same or different fluoroalkyl groups of from 1 to about 10 carbon atoms or taken together are $(CF_2)_n$ wherein n is 2 to 10; X is selected from the group consisting of oxygen, sulfur, nitrogen, phosphorous, other Group Va element, and other Group VIa element. By the terms "other Group Va element" and "other Group VIa element", these terms are understood to mean herein any other element in one of these groups of the periodic table that is other than the recited elements (i. e., oxygen, sulfur, nitrogen, phosphorous) in these groups. Oxygen is the preferred X group.

Some illustrative, but non limiting, examples of representative comonomers containing a fluoroalcohol functional group and within the scope of the invention are presented below:

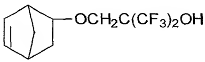


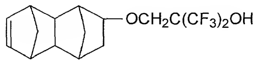






$CH_2{=}CHOCH_2CH_2OCH_2C(CF_3)_2OH$ $CH_2{=}CHO(CH_2)_4OCH_2C(CF_3)_2OH$





Various bifunctional compounds which can initially afford crosslinking and subsequently be cleaved (e. g., upon exposure to strong acid) are also useful as comonomers in the copolymers of this invention. As an illustrative, but nonlimiting example, the bifunctional comonomer NB-F-OMOMO-F-NB is desirable as a comonomer in the copolymers of this invention. This and similar bifunctional comonomers, when present in the copolymer component(s) of photoresist compositions of this invention, can afford copolymers that are of higher molecular weight and are lightly crosslinked materials. Photoresist compositions, incorporating these copolymers comprised of bifunctional monomers, can have improved development and imaging characteristics, since, upon exposure (which photochemically generates strong acid as explained infra), there results cleavage of the bifunctional group and consequently a very significant drop in molecular weight, which factors can afford greatly improved development and imaging characteristics (e. g., improve contrast).

Exposure at I-line (365 nm), DUV (248 – 254 nm, 193 nm), VUV (157 nm), EUV (aka x-ray 13.4 nm).